

WHAT IS CLAIMED IS:

1. A packaging machine for wrapping, folding and taping a flexible photoconductive belt loop to prevent light from shocking such photoconductive belt loop during shipping and during loading into a machine, the packaging machine comprising;

(a) a series of movable mandrels holding removable cylindrical cores for supporting, tensioning and folding the flexible photoconductive belt loop;

(b) means for feeding a light occluding and protective flexible sheet over an external surface of the flexible photoconductive belt loop to form a photoconductive belt loop and protective sheet assembly thereof, said light occluding and protective flexible sheet having a first end, and a second end including a loop tacking portion adjacent said second end for overlapping said first end;

(c) an aperture former for forming at least one loop tacking aperture through said loop tacking portion of said second end;

(d) folding and end-tucking mechanisms for folding the photoconductive belt loop and protective sheet assembly into a tightly folded belt and paper assembly around said cylindrical cores; and

(e) first and second taping stations for applying an end pull tab piece of tape, and a loop tacking piece of tape over said loop tacking portion and through said at least one loop tacking aperture onto a portion of said first end of said light occluding and protective flexible sheet.

2. The machine of Claim 1, including a folding station having a tucking device for tucking an overlapping portion of the lead end of the cut sheet of photo paper around said tightly folded belt and paper assembly of the cut sheet of photo paper and the photoconductive belt *loop*

3. The machine of Claim 1, wherein said light occluding and protective flexible member is comprised of black photo paper.

4. The machine of Claim 1, wherein a plurality of said at least one aperture is formed through said loop tacking portion.

5. A packaging machine for wrapping, folding and taping a flexible photoconductive belt loop to prevent light from shocking such photoconductive belt loop during shipping and during loading into a machine, the packaging machine including:

(a) a protective photo paper holding and supply assembly for holding and feeding a web of protective photo paper;

(b) an arc-shaped paper guide for guiding and positioning a section of fed web of protective photo paper;

(c) a photoconductive belt loop support and folding assembly for supporting and folding the photoconductive belt loop and a cut sheet of fed photo paper, said photoconductive belt loop support and folding assembly including (i) a wrapping station located above a first portion and underneath a second portion of said arc-shaped paper guide, (ii) a travel track, (iii) a translational first drive means and a rotational second drive means, (iv) a first movable carriage having a first mandrel and a second mandrel each for supporting a first packaging core member and a second packaging core member, and (v) a second movable carriage having a third mandrel for supporting a third packaging core member;

(d) means for folding an assembly of the cut sheet of fed photo paper and the photoconductive belt loop into a tightly folded belt and paper assembly around said first, said second, and said third packaging core members; and

(e) a first taping station and a second taping station located adjacent said travel track for applying an instruction and loop tacking tape over said at least one loop tacking aperture, and a pull tab tape over said second end of said cut sheet of photo paper and over a portion of said tightly folded belt and paper assembly of the cut sheet of photo paper and the photoconductive belt loop.

6. The packaging machine of Claim 5, wherein said protective photo paper holding and supply assembly includes (i) feed wheels for feeding the web of protective photo paper, (ii) a lead-end sensor for limit-sensing a lead end of a fed web of photo paper; and (iii) a web cutter located upstream of said lead-end sensor relative to a direction of web feed for cutting the fed web of photo paper to a desired length.

7. The packaging machine of Claim 5, wherein said arc-shaped paper guide includes a gate therein for reciprocal movement of said first movable carriage and said second movable carriage.

8. The packaging machine of Claim 5, including a folding station having a tucking device for tucking an overlapping portion of the lead end of the cut sheet of photo paper around said tightly folded belt and paper assembly of the cut sheet of photo paper and the photoconductive belt loop.

9. The packaging machine of Claim 5, wherein said second carriage includes a hold-down finger for tucking the trail end portion of said cut sheet of photo paper over a tucked overlapping portion of the lead end of said cut sheet of photo paper.

10. The packaging machine of Claim 5, wherein said wrapping station includes (i) a loading position having said first carriage and said second carriage spaced a first distance from each other for receiving the photoconductive belt loop in a non-tensioned form, (ii) a tensioning position having said first carriage and said second carriage spaced a second distance from each other for tensioning the photoconductive belt loop about said second and said third packaging core members, and (iii) a threading position having a threading gap between a portion of said photoconductive loop over said second packaging core member and said first packaging core member is located across said gate in said arc-shaped paper guide for receiving a threaded lead end of said fed web of photo paper.

11. The packaging machine of Claim 5, wherein each said packaging core member comprises a cylindrical hollow paper core.

12. The packaging machine of Claim 5, wherein said first carriage is coupled to both said translational first drive means, and said rotational second drive means.

13. The packaging machine of Claim 5, wherein said first mandrel and said second mandrel are rotatable about each other for folding a tensioned photoconductive belt loop and cut sheet of photo paper assembly into said tightly folded belt and paper assembly.

14. The packaging machine of Claim 7, wherein said arc-shaped paper guide includes a removable shutter for closing said gate during feeding of a lead end of a fed web of photo paper across said gate.

15. The packaging machine of Claim 7, wherein said gate is located along said arc-shaped paper guide such that a first section of the fed web of photo paper, within said arc-shaped paper guide between said lead-end sensor and said gate, is longer than a second section of the fed web of photo paper within said arc-shaped paper guide between said gate and said web cutter.

16. The packaging machine of Claim 8, wherein said tucking device includes a curved finger and vertical moving means for moving said curved finger into and out of a tucking position.

17. The packaging machine of Claim 8, including a horizontal bar for pressing a tucked trail end of said cut sheet of photo paper over a tucked said overlapping portion of the lead end of said cut sheet of photo paper.

18. The packaging machine of Claim 9, including means for rotating said hold-down finger at the folding station from a home position into a deflecting and tucking position for tucking said trail end portion of said cut sheet of photo paper.

19. The packaging machine of Claim 10, including means for moving the photoconductive belt loop tensioned about said second and said third packaging core members through said gate and against said threaded lead end of said fed web of photo paper, thereby pulling an upper section and a lower section of a cut sheet of photo paper web within said arc-shaped paper guide over the tensioned photoconductive belt loop.

20. The packaging machine of Claim 10, wherein said first mandrel having said first packaging core member thereon is movable translationally against said second packaging core member for pinching the fed web of photoconductive paper within said threading gap.

21. A packaging method for wrapping, folding and taping a flexible photoconductive belt loop to prevent light from shocking such photoconductive belt loop during shipping and during loading into a machine, the packaging method comprising:

(a) supporting and tensioning the flexible photoconductive belt loop over first and second packaging cores mounted on mandrels;

(b) feeding a light occluding and protective flexible sheet having a lead end and a trail end over the flexible photoconductive belt loop to form a belt and sheet assembly;

(c) forming a loop tacking aperture through a loop tacking portion of said trail end of said light occluding and protective flexible sheet;

(d) folding said belt and sheet assembly into a tightly folded pattern around a third packaging core and around one of said first and second packaging cores;

(d) applying an end pull tab adhesive tape over said trail end and over a portion of said light occluding and protective flexible sheet underneath said trail end; and

(e) applying a loop tacking tape over said loop tacking portion, through said loop tacking aperture, and onto a portion of said light occluding and protective flexible sheet underneath said loop tacking portion thereof.

22. A packaging method of packaging a flexible photoconductive belt loop to prevent light from shocking said flexible photoconductive belt loop during shipping and during loading into a machine, the method comprising:

(a) loading the flexible photoconductive belt loop having a circumference L1 over a first movable core and a second movable core;

(b) moving at least one of said first movable core and said second movable core to tension said flexible photoconductive belt loop;

(c) feeding a length L2 of a light occluding and protective flexible member through a fixed arc into a position over said tensioned flexible photoconductive belt loop;

(d) first moving said tensioned flexible photoconductive loop horizontally to a first side to position said movable first movable core and a third movable core under said length L2 of said light occluding and protective flexible member;

(e) threading said length L2 of said light occluding and protective flexible member over a portion of said flexible photoconductive belt loop within a threading gap between said first movable core and said third movable core;

(f) feeding a rest of said total length L3 of said light occluding and protective flexible member through said threading gap and forming a larger arc thereof;

(g) pinching the threaded light occluding and protective flexible member and flexible photoconductive belt loop within said threading gap by moving said third packaging core against said first packaging core;

(h) forming at least one loop tacking aperture through a portion of said trail end of said trailing length portion



(i) secondly further moving said tensioned flexible photoconductive belt loop horizontally to said first side causing said light occluding and protective flexible member to wrap itself onto the outside surface of the flexible photoconductive belt loop forming a wrapped assembly;

(j) rotating said third packaging core and said first packaging core thereby folding the wrapped assembly into a tightly folded belt and paper assembly;

(k) tucking said lead end of the light occluding and protective flexible member under the trail end thereof;

(l) moving the tightly folded belt and paper assembly horizontally to a second and opposite direction;

(m) vacuum grasping, tensioning and wrapping the trail end of the light occluding and protective flexible member around and under the tightly folded belt and paper assembly;

(n) applying an adhesive backed loop tacking tape over said trail end, through said at least one loop tacking aperture and onto said lead end; and

(o) applying a pull tab adhesive tape over the trailing end, thereby holding the whole tightly folded belt and paper assembly together.